IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

# Bus Location Tracking and Alert to Students

**Pulave Vaibhav V.[1], Pawar Narendra D.[2], Muntode Pramod R.[3], Pathan Rehan A.[4], Mr. S. R. Tribhuvan[5], Miss. V. D. Vaidya[6]**
Department of Cloud Computing[1,2,3,4,5,6]
Padmashri Dr. Vitthalrao Vikhe Patil Institute of Technology and Engineering (Polytechnic), Pravaranagar

**Abstract:** *Student safety is a primary concern in our society. Increased rates of student abduction signify the relevance of a proper mechanism to track children. The current system involves students calling the bus driver to ensure to know the current location. There is always an element of uncertainty regarding student whereabouts. Proposed system involves a low-cost solution by allowing students to track bus location via a mobile application. The system involves providing the bus conductor app to update the current stop location, so students are aware of the bus location. This work involves identification of students present in the bus along with tracking of bus.*

**Keywords:** Bus Track, Alert, Android, API's

## I. INTRODUCTION

### 1.1 Overview

The general objective of the development of this system is to help people track things in more efficient way and effective way resulting in greater reliability. In real life, when a freight service provider wants to track his/ her shipment service which is been carried by a vehicle. It's really difficult to man- age all those fleet of vehicles which is in movement in whereas corners of the city. There are buses made available for passengers travelling distances, but not many passengers have complete information about these buses. Complete information namely the number of buses that go to the required destination, bus numbers, bus timings, the routes through which the bus would pass, time taken for the bus to reach, maps that would guide the passenger with his/her route and most importantly, track the current location of the bus and give the correct time for the bus to reach its bus stop. The proposed system deals with overcoming the problems stated above. The system is an Android application that gives necessary information about all the buses travelling in Pune. This information overcomes the problems faced in the previously built application "Pune Bus Guide". The platform chosen for this kind of system is android, reason being Android Operating System has come up on a very large scale and is owned by almost every second person. Also, Android is a user friendly platform, thereby enabling ease of access for all the users. A number of applications made for the Android Operating System is increasing on a large scale ever since its advent. Android is an open source mobile software environment. Brought up by Google, the operating system has been made Linux based and uses Java programming language. It has a virtual machine that is used to optimize memory usage as well as resources. This application has been developed using IDE (Android Studio 1.6) with ADT (Android Development Tools) and Android SDK (Software Development Kit). There are a number of constraints that need to be satisfied.

### 1.2 Motivation

In today's fast-paced world, ensuring the safety and well-being of our students is more critical than ever. With incidents of student abductions on the rise, there's an urgent need for proactive measures to protect our children during their daily commutes. The current system of relying on phone calls to track bus locations leaves too much room for uncertainty and anxiety, both for students and their families. However, by embracing innovative solutions like a mobile application for bus tracking, we can empower students with real-time information and provide parents with much-needed peace of mind. By investing in such initiatives, we not only enhance safety protocols but also demonstrate our commitment to prioritizing the welfare of our students. Together, let's embrace technology to create safer environments for our children to thrive and succeed.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

### 1.3 Problem Definition and Objectives

The problem at hand revolves around the necessity for an effective Bus Location Tracking and Alert System tailored specifically for students. In the current scenario, challenges such as the inability to monitor the real-time location of school buses, safety concerns during transit, and a communication gap between schools, parents, and students have become prominent issues. This lack of a centralized system for bus tracking contributes to uncertainties, operational inefficiencies, and safety anxieties. Additionally, emergency situations may not be promptly addressed due to the absence of a reliable alert system. To address these challenges, the proposed solution entails the development and implementation of a comprehensive system that ensures real-time bus location tracking, timely communication of updates, and swift alerts during emergencies. This solution not only aims to enhance the safety and security of students but also contributes to operational efficiency, parental assurance, and regulatory compliance in school transportation.

- To implement a mobile application for real-time bus location tracking, enhancing student safety.
- To develop a low-cost solution that allows students to track the location of their school bus effortlessly.
- To empower students with greater control over their commute by providing them with accurate bus location updates.
- To alleviate parental concerns by offering a reliable mechanism for monitoring their children's school bus journeys.
- To revolutionize student transportation by harnessing the power of technology to create safer environments for our children.

### 1.4.Project Scope and Limitations

The project aims to develop a user-friendly mobile application that enables real-time tracking of school buses, providing students and parents with accurate location updates. It includes implementing features such as bus route information, estimated arrival times, and notifications for significant bus movements. The scope also encompasses integrating the application with the bus conductor's interface for seamless data updating.

**Limitations As follows:**

- Dependency on internet connectivity may affect the reliability of bus location updates in areas with poor network coverage.
- The accuracy of bus location data may be influenced by factors such as GPS signal strength and device compatibility.
- The effectiveness of the application relies on the cooperation and timely input of bus conductors, which may vary depending on individual adherence to protocols.

## III. LITERATURE REVIEW

**"Review of Bus Tracking and Alert Systems for Student Safety":** This review provides an overview of various bus tracking and alert systems implemented in educational institutions to ensure the safety of students during transportation. It discusses the technological aspects, such as GPS tracking, RFID systems, and mobile applications, along with their effectiveness in enhancing student security.

**"A Systematic Review on Real-Time Bus Tracking Systems for Educational Institutions":** This systematic review analyzes the existing literature on real-time bus tracking systems specifically designed for educational institutions. It evaluates the features, functionalities, and implementation challenges of different systems and identifies best practices for improving student safety and transportation efficiency.

**"Assessment of Bus Location Tracking Technologies for Student Safety in Urban Areas":** Focusing on urban environments, this literature review assesses various bus location tracking technologies utilized to enhance student safety during transit. It explores the integration of GPS, GIS, and mobile communication technologies in tracking systems and evaluates their impact on reducing risks associated with school transportation.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

**"Mobile-Based Alert Systems for Students Using Public Transportation: A Literature Review":** This review examines mobile-based alert systems designed to enhance the safety of students using public transportation, including school buses. It discusses the functionalities of such systems, such as panic buttons, location sharing, and emergency notifications, and evaluates their effectiveness in mitigating safety concerns.

**"Technological Innovations for Student Transportation Safety: A Comprehensive Review":** Offering a comprehensive overview, this review explores a wide range of technological innovations aimed at improving student transportation safety, including bus location tracking and alert systems. It discusses the integration of IoT, cloud computing, and data analytics in modern transportation solutions and assesses their potential to address safety challenges faced by students.

## IV. REQUIREMENT SPECIFICATIONS

**Software Requirements:**

- Operating System:
- Server: Linux-based OS (Ubuntu Server, CentOS) or Windows Server OS (Windows Server 2016 or later)
- Development Machines: Windows,
- Android Studio

**Hardware Requirements:**

- Processor: Intel Core i5 or equivalent
- Memory RAM: Minimum 8 GB RAM

## V. SYSTEM DESIGN

### 5.1 System Architecture

The below figure specified the system architecture of our project.

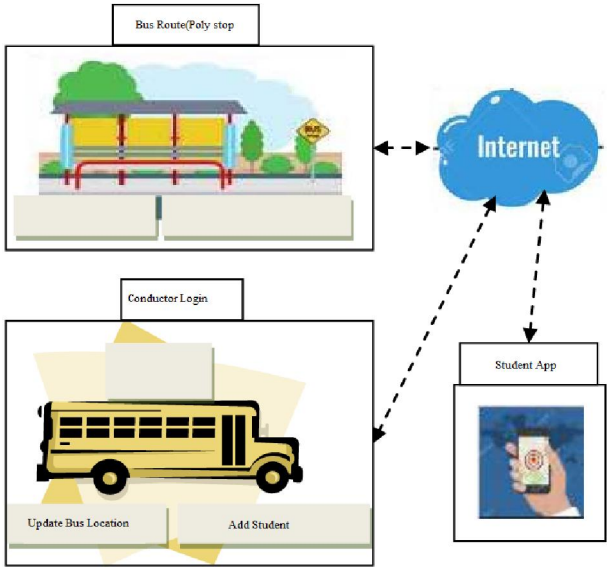


Figure 4.1: System Architecture Diagram

The system comprises three primary modules: Conductor, Admin, and Student, each serving distinct functions to facilitate efficient bus location tracking and student alerts. The Conductor module is designed for bus drivers, allowing them to log in with unique credentials and activate location services on their mobile devices before driving. The module automatically updates the bus's current location to the server in real-time, ensuring accurate tracking throughout the journey. The Admin module provides administrative control, allowing authorized

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

personnel to manage system information. Administrators can log in, add bus drivers, assign buses, and register students. This module ensures the smooth operation of the system by facilitating necessary updates and adjustments as required.

The Student module, central to the system's functionality, empowers students to access bus information and track their location in real-time. Students can log in through their smartphones, view details of available buses, and track their locations from any location. This module enhances convenience and safety for students, allowing them to plan their journeys effectively and utilize waiting time efficiently by selecting the nearest bus route. Overall, the system optimizes student transportation by providing reliable tracking and alerts, ensuring a seamless and secure commuting experience.

### 5.2 UML Diagram

The below figure specified the circuit diagram of our project.

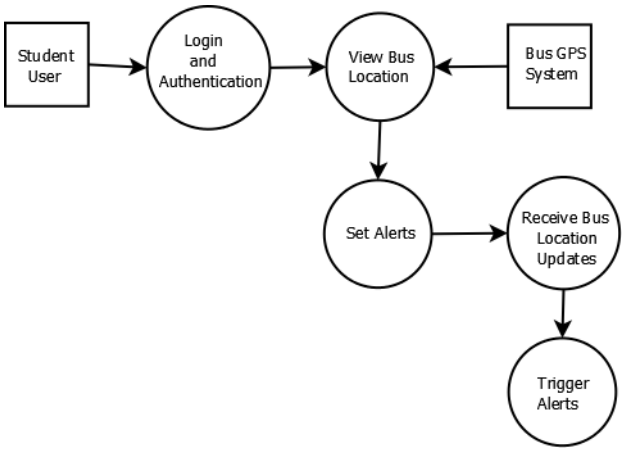


Figure 4.2: DFD Diagram

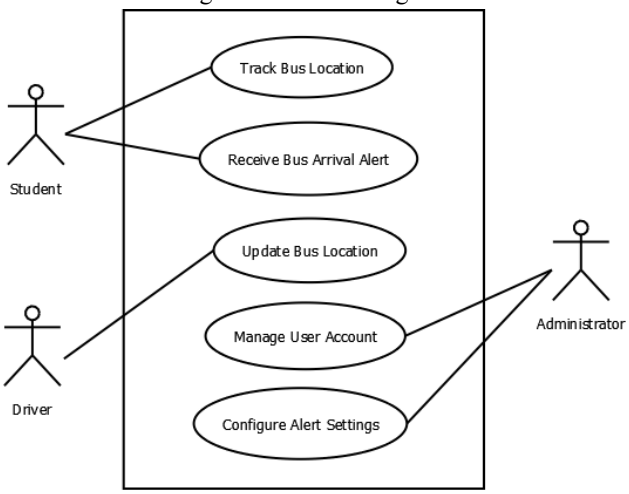


Figure 4.3: Usecase Diagram

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

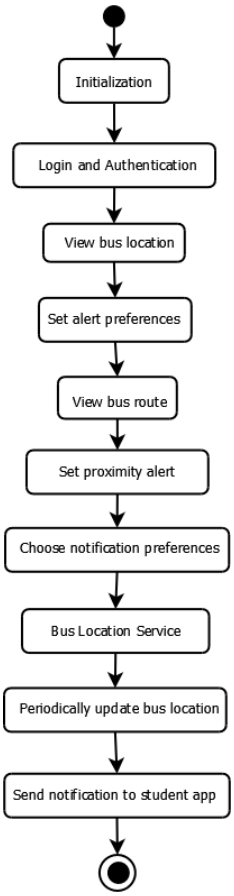


Figure 4.4: Activity Diagram

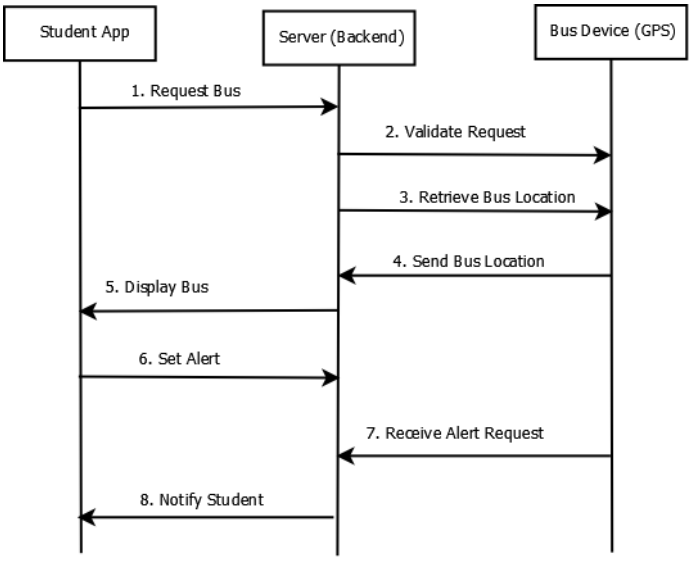


Figure 4.5: Sequence Diagram


DOI: 10.48175/568

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

## VI. RESULT

The implementation of the bus location tracking and alert system, comprising the Conductor, Admin, and Student modules, yields significant benefits for all stakeholders involved. Bus drivers can seamlessly update their locations, ensuring accurate tracking for students and timely arrivals at their destinations. Administrators have centralized control, enabling them to manage personnel and resources efficiently. Most importantly, students gain access to real-time bus information, empowering them to make informed decisions about their commute and utilize waiting time effectively. This system not only enhances convenience but also fosters a safer and more efficient transportation environment, ultimately contributing to the overall well-being and satisfaction of students and their families.

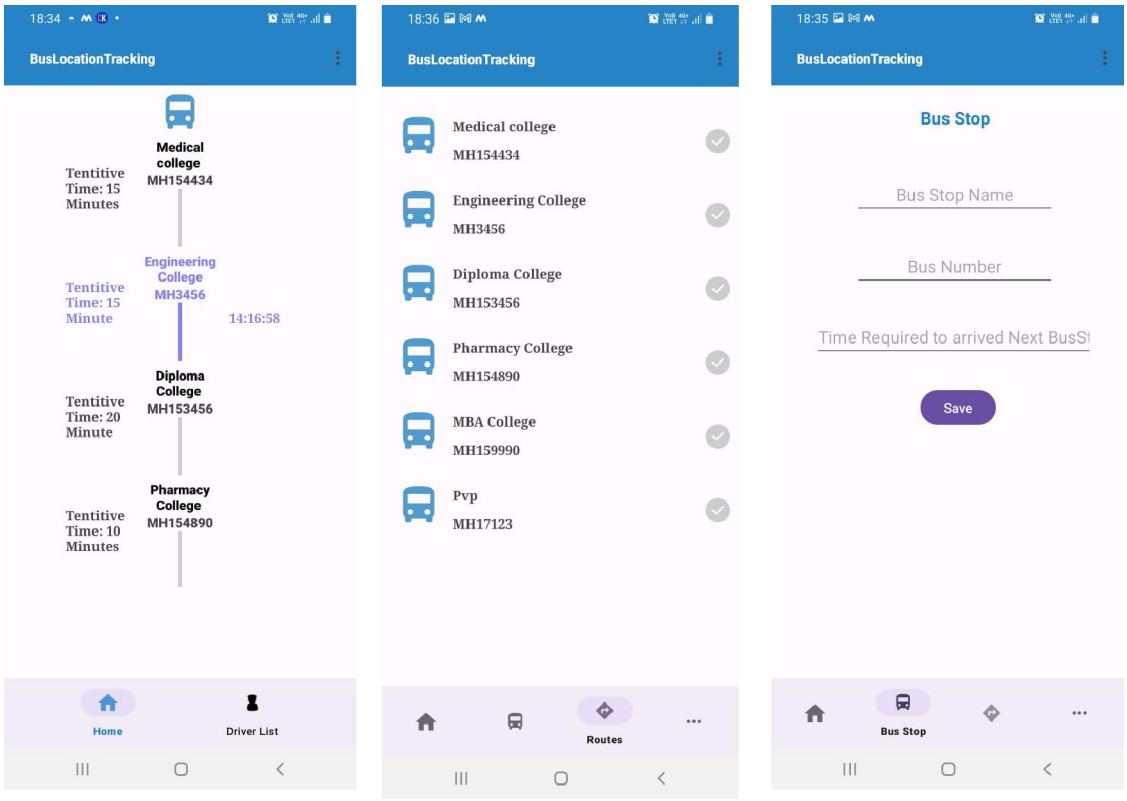


Figure 6.1: Output of System

## VII. CONCLUSION

### Conclusion

In this project we designed and developed a real time bus tracking system using Android studio. In this project we try to save the time of the students mainly who uses the college transportation service and we also tend to help them with easy and tension mornings for a bright and peaceful day. This application does not need any external hardware except a smartphone which is available to all the students. So, the overall cost is very low or no cost needed for tracking the bus location. It provides nearly accurate data in real time that makes possible for the user to track the buses.

### Future Work

In future iterations, the bus location tracking and alert system could be enhanced by integrating advanced technologies such as machine learning algorithms for predictive arrival time estimation, optimizing route planning, and providing personalized notifications to students based on their preferences. Additionally,

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, April 2024

incorporating features like geofencing for automatic check-ins when students board or alight the bus, and integrating with other transportation modes for seamless interconnectivity, could further improve the efficiency and convenience of student transportation. Furthermore, expanding the system to include additional safety features such as panic buttons or emergency response integration could enhance student security during their commute. Overall, continued development and refinement of the system hold the potential to revolutionize student transportation, providing safer, more efficient, and personalized commuting experiences.

## BIBLIOGRAPHY

**[1].** Vaibhav V. Pulave, Narendra D. Pawar, Pramod R. Muntode, Rehan A. Pathan, S.R. Tribhuvan, V.D. Vaidya. "Bus Location Tracking & Alert to Students." Department of Cloud Computing, PadmashriDr.VitthalraoVikhePatil Institute of Technology and Engineering (Polytechnic) Pravaranagar.

**[2].** Kulkarni, A., Pathan, R., &Kumbhar, A. (2018). "Real-Time Bus Tracking System Using Android Application." International Journal of Engineering Research and Technology, 7(8), 419–423.

**[3].** Ghosh, R., Ruidas, P., Kundu, S., & De, P. (2017). "Real-Time Bus Tracking System Using Android Application." International Research Journal of Engineering and Technology, 4(10), 1443–1446.

**[4].** Singh, R., & Gupta, N. (2019). "Smart Bus Tracking System Using Android Application." International Journal of Computer Applications, 183(17), 13–16.

**[5].** Jain, R., & Shah, H. (2016). "Smart Bus Tracking and Management System." International Journal of Science, Engineering and Technology Research, 5(4), 1291–1294.

**[6].** Mokashi, R. N., &Gawande, S. S. (2017). "Mobile Based Bus Tracking System." International Journal of Computer Applications, 162(13), 29–31.

**[7].** Aher, S. P., Patil, D. B., &Sutar, S. S. (2018). "Real-Time Bus Tracking and Passenger Alert System Using Android Application." International Journal of Innovative Research in Computer and Communication Engineering, 6(4), 5980–5984.

**[8].** Marathe, A. R., Bhadarge, A. B., &Shelke, A. D. (2018). "Real-Time Bus Tracking and Management System Using Android Application." International Journal of Scientific Engineering and Research, 6(5), 482–486.

**[9].** Kamble, R. S., &Patil, V. D. (2018). "Bus Tracking and Alert System for College Students." International Journal of Innovative Technology and Exploring Engineering, 7(8), 68–70.

**[10].** Lokhande, P. S., Shinde, P. V., &Pawar, P. M. (2018). "Bus Tracking and Arrival Alert System Using Android Application." International Journal for Research in Applied Science and Engineering Technology, 6(6), 332–336.

**[11].** Pawar, S. R., & Mane, A. G. (2018). "Smart Bus Tracking System Using GPS and GSM Technology." International Journal of Innovative Research in Science, Engineering and Technology, 7(8), 11651–11655.

**[12].** Gosavi, A., &Aher, A. (2019). "Real-Time Bus Tracking and Management System Using Android Application." International Journal for Research in Applied Science and Engineering Technology, 7(7), 2667–2672.

**[13].** Kadam, A., &Jagtap, S. (2018). "Android Application for Bus Tracking System." International Journal of Engineering and Advanced Technology, 7(5), 101–105.

**[14].** Bajad, M., Kharde, S., &Deshmukh, S. (2019). "Bus Tracking and Management System." International Journal of Recent Technology and Engineering, 8(4), 2990–2993.

**[15].** Choudhary, A., &Patil, A. (2018). "Bus Tracking and Arrival Alert System Using Android Application." International Journal of Engineering Research and General Science, 6(4), 130–134.